

CLAIMS

1. A drying apparatus comprising a heat pump apparatus composed by sequentially connecting in series: a compressor that compresses a refrigerant; a radiator that radiates the refrigerant discharged from the compressor; an expansion valve that expands the refrigerant radiated in the radiator; and an evaporator that evaporates the refrigerant expanded by the expansion valve, and an air channel in which drying air heated in the radiator is introduced to a subject to be dried, the drying air that absorbs moisture from the subject to be dried being dehumidified in the evaporator, and the dehumidified air being then heated in the radiator again to reuse the dehumidified air as the drying air, the drying apparatus comprising:

15 a first temperature sensor for detecting the temperature of the refrigerant between the outlet of the evaporator and the inlet of the compressor; and

control means for controlling a superheat value by changing flow resistance of the expansion valve based on a detected value of the first temperature sensor.

2. The drying apparatus according to claim 1, further comprising:

25 storage means for storing correlation data between time elapsing from start of operation of the heat pump apparatus and evaporation temperature of the refrigerant in the evaporator, and a target superheat value in advance;

a timer for detecting operation time of the heat pump apparatus; and

30 processing means which estimates the evaporation temperature of the refrigerant based on the operation time detected by the timer and the correlation data stored in the

storage means, and then estimates a superheat value based on the estimated evaporation temperature and the detected value detected by the first temperature sensor,

wherein the control means controls the flow resistance of the expansion valve so that the superheat value estimated by the processing means becomes the target superheat value stored in the storage means.

3. The drying apparatus according to claim 1, further comprising:

storage means for storing a target superheat value in advance;

second temperature sensor for detecting the temperature of the refrigerant between the outlet of the expansion valve and the inlet of the evaporator; and

processing means which calculates a superheat value based on a detected value detected by the second temperature sensor and the detected value detected by the first temperature sensor,

wherein the control means controls the flow resistance of the expansion valve so that the superheat value calculated by the processing means becomes the target superheat value stored in the storage means.

4. The drying apparatus according to claim 2, wherein the control means controls the flow resistance of the expansion valve so that the superheat value after the operation time of the heat pump apparatus elapses beyond predetermined time becomes larger than that before the predetermined time elapses.

5. The drying apparatus according to claim 3, further comprising:

a timer for detecting operation time of the heat pump

apparatus, wherein the control means controls the flow resistance of the expansion valve so that the superheat value after the operation time of the heat pump apparatus elapses beyond predetermined time becomes larger than that before the predetermined time elapses.

6. The drying apparatus according to claim 4 or 5, further comprising:

selection means for selecting whether to apply the superheat value larger than that before the predetermined time elapses to that after predetermined time elapses or not.

7. The drying apparatus according to claim 1, further comprising:

a third temperature sensor for detecting the temperature of the refrigerant between the outlet of the compressor and the inlet of the expansion valve.

8. The drying apparatus according to claim 7, wherein, in the case where a detected value detected by the third temperature sensor becomes predetermined temperature or more, the control means controls the expansion valve so as to make the flow resistance of the expansion valve smaller.

9. The drying apparatus according to claim 1, further comprising:

discharge pressure detecting means for detecting discharge pressure of the compressor.

10. The drying apparatus according to claim 9, wherein, in the case where a detected value detected by the discharge pressure detecting means becomes predetermined pressure or more,

the control means controls the expansion valve so as to make the flow resistance of the expansion valve smaller.